

**Amendments to the Drawings:**

The attached sheet(s) of drawings includes changes to Fig. 1-7.

### **Remarks**

We respectfully submit that, although the device mentioned in Roberts US 3,009,571 morphologically resembles the device of the present invention, it is functionally different for the following reasons as set out below.

#### **Summary of Argument**

Roberts US 3,009,571 teaches the formation of a series of singular particulate streams by the use of an annular channel arrangement. The channeled particulate enters the respective inspection zone for that channel and a centralized detector for receiving light reflected from an article in each of said paths in succession.

Roberts also discloses that the detection and ejection devices are intrinsically linked to the channel and subsequently formed “plurality of paths” (Roberts column 5 lines 19 to 26 also see fig 1).

The method and apparatus of the present application does not form channels nor creates a series of inspection zones about a centered detector. Instead, a bulk feed of particulates from the conical dispersion body member randomly disperses the particles into an annular curtain of particles dispensed about a generally centered detector. The detector detects undesired particle(s) from the random product curtain, tags and maps the particulate locations. The Ejector or multiples thereof, associated to the particle location at point of ejection are operated to remove the particle from random bulk stream.

Therefore, it is respectfully submitted that the pending claims are both novel and inventive over Roberts US 3,009,571

#### **Response to Rejection of Claim 1**

Roberts discloses a series of singular streams of product via an annular arrangement to form a number of ordered single file particulate streams “plurality of paths” (17, fig 3) (Claim 5, also cited in Claims 1 -10, 12, 14,15,18-24).

Examples of such apparatus are commonly referred to as channel sorters - see patents US 4454029 Agricultural product sorting and Patent US 4697,709 Sorter for agricultural product.

One versed in the art of channel sorting would distinguish the following:

1. The particulate type must be similar in size and type. Channel construction (width between channel sides) limit Particulate size variations, typically uniform products like beans and grains are sorted.
2. By channel, particulate form into and pass through the respective detection and ejection zones in single file in the respective channels.
3. Particulate is channeled directly over narrow zone of detection and ejection device. (Claim 7)
4. Intrinsic linking of particulate path to electro mechanical detection and rejection. Thus if the particle falls outside the desired particulate path, then detection and possible ejection will fail to occur. See Roberts claims 6 and 7
5. Channel separation - The formation of channels require separation between the channels, this can be in the order of two to four times greater than the effective width of the channel
6. Linear channels - channels must remain practically straight and of constant width. Reducing channel width creates blockage, expanding channel width may increase potential for multiple products at once
7. Linear channels in an annular system - Since the channel width remains constant as the diameter of the cone increases thus the separation between channels increases. Thus the greater the diameter of the cone the greater the “dead space” between the channels, so that the ratio of the number of channels with respect to the total conical feed diameter diminishes (potential sorting area).

The present patent application distributes particulate randomly in bulk over the conical feed surface to feed a bulk curtain (not single file or ordered streams) of particulate into the inspection zone. Thus, dependencies on single file, uniform size, path formation or channeling are overcome in this novel approach. Every particulate that is randomly fed through the vertical annular particulate curtain is individually mapped and ejector(s) are selected on a particle by particle basis, thus, the Roberts intrinsic linking of detection and rejection electro mechanical system to the channel "path" has been overcome in the present application through novel design.

Due to the aforementioned differences, the present application's annular random bulk feeding and detection system could not be obvious to one of average skill or taught by Roberts "plurality of paths" channel feeding and detection.

Therefore, it is respectfully submitted that claim 1 is both novel and inventive over Roberts US 3,009,571

### **Response to Rejection of Claim 2**

Roberts teaches the formation of a series of singular particulate streams by the use of an annular channel arrangement. The channeled particulate enters the respective inspection zone for that channel and a detector for receiving light reflected from an article in each of said paths in succession.

Roberts also discloses that the detection and ejection devices are intrinsically linked to the channel and subsequently formed "plurality of paths" (Roberts column 5 lines 19 to 26) also see (fig 1)

The preferred embodiment of the application does not form channels nor creates a series of inspection zones about a centered detector. Instead, it forms a bulk feed of particulate from by means of the conical dispersion body member that randomly disperses the

particles into an annular curtain of particles dispensed about a generally centered detector. The detector detects undesired particle(s) from random product curtain, tags and maps the particulate location. The Ejector or multiples thereof, associated to the particle location at point of ejection are operated to remove the particle from random bulk stream.

Due to the aforementioned differences, the present application's annular random bulk feeding and detection system could not be obvious to one of average skill or taught by Roberts "plurality of paths" channel feeding and detection.

Therefore, it is respectfully submitted that claim 2 of the present application is both novel and inventive over Roberts US 3,009,571

### **Response to Rejection of Claim 3**

As previously discussed in the Claim 1 and 2 responses, Roberts forms a series of single paths distributed annular as disclosed (fig. 1) a sorting method including the steps of: forming an annular arrangement of a "plurality of paths" (Claim 5, also cited in Claims 1 -10, 12, 14,15,18-24) of particulate material by axially flowing the particulate material over a body member comprising of a number of individual feed channels.

The preferred embodiment of the application distributes particulate randomly in bulk over the conical feed surface to form an annular feed bulk curtain of particulate into the inspection zone. Thus dependencies on single file, uniform size, path formation or channeling are overcome in this novel approach. Every particulate that is randomly fed through the vertical annular particulate curtain is individually mapped and ejector/s are selected on a particle by particle basis, thus the Roberts intrinsic linking of detection and rejection electro mechanical system to the channel "path" has been overcome in the present application through novel design.

**Claim 3 is dependant on Claim 2.**

Due to the aforementioned differences and dependency, this application's annular random bulk feeding and detection system could not be obvious to one of average skill or taught by Roberts "plurality of paths" channel feeding and detection.

Therefore, it is respectfully submitted that claim 3 of the present application is both novel and inventive over Roberts US 3,009,571

#### **Response to Rejection of Claim 4**

Roberts teaches the formation of a series of singular particulate streams by the use of a channel arrangement, the channeled particulate enters the respective inspection zone for that channel. The channels are centrally disposed about a detection device. The wider the cone the more 'the ratio of effective sorting are over total area is reduced.

The preferred embodiment of the application instead forms a random bulk feed of particulate by means of the conical dispersion body member to randomly disperse the particles into a curtain dispensed about a generally centered detector. Thus dependencies on single file, uniform size, path formation or channeling are overcome in this novel approach.

#### **Claim 4 is dependant on Claim 2**

Due to the aforementioned differences and dependency, the present application's annular random bulk feeding and detection system could not be obvious to one of average skill or taught by Roberts "plurality of paths" channel feeding and detection.

Therefore, it is respectfully submitted that claim 4 of the present application is both novel and inventive over Roberts US 3,009,571

#### **Response to Rejection of Claim 5**

A rotating source as disclosed in the preferred embodiment of the present

application has a single point of illumination, thus at any time the reflected light measured by the detector can only be from the surface that the rotating source is illuminating at any point in time.

An array of lights would transmit light not only onto the target particulate but also onto any surface including other particulate and any other surface angled substantially normal to the incandescent light source. Depending on any of the surfaces angularity, and reflective properties, the surfaces may reflect or scatter light of which some will reflect onto the detection device. This light will combine with the light reflected from the target particulate and corrupt the resulting signal for the desired particulate.

**Claim 5 is dependant on Claim 2 via Claim 4**

Due to the aforementioned differences and dependency, the present application's "actual or effectively rotating a source" could not be obvious to one of average skill or taught by Roberts "annular incandescent light array".

Therefore, it is respectfully submitted that claim 5 of the preferred embodiment of the present application is both novel and inventive over Roberts US 3,009,571

**Response to Rejection of Claim 10**

Roberts teaches a method in which incandescent polychromatic light is used within the process to detect over multiple wavelengths to form the art of a channel sorting apparatus in an annular formation.

The preferred embodiment of the present application teaches a method in which polychromatic point source illumination is used within the process to detect over multiple wavelengths and forms part of the art of annular random bulk annular sorting apparatus.

Claim 10 is dependant on Claim 2 via claim 5 and the use of “polychromatic light for detection” when used in combination with the novel bulk random particulate annular sorting apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that claim 10 of the present application is both novel and inventive over Roberts US 3,009,571.

#### **Response to Rejection of Claim 12**

Roberts teaches a method in which photo multipliers are used within the process to detect incandescent illumination to form part of the art of a channel sorting apparatus in an annular formation.

The present application teaches the a method in which photo multipliers, CCD arrays or like photoelectric sensitive measuring devices, are used within the process to detect point source illumination forms part of the art of annular random bulk annular sorting apparatus.

Claim 12 is dependant on Claim 2 via claims 11, 10, and 5, and the use of “photo multipliers, CCD arrays or like photoelectric sensitive measuring devices” when used in combination with the novel bulk random particulate annular sorting apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that claim 12 of the present invention is both novel and inventive over Roberts US 3,009,571

#### **Response to Rejection of Claim 13**

Roberts discloses the operation of a singular ejection device with respect to a channel.



Claim 13 discloses the operation of one or more ejectors with respect to the detection of a randomly distributed particulate in the inspection zone. The number of ejectors activated at any time can be increased or decreased according to the target particulate rejection requirements.

**Claim 13 is dependant on Claims 2 to 12**

Due to the aforementioned differences and dependency, the present invention's random bulk feed ejection system could not be considered obvious to one of average skill or taught by Roberts singular ejector intrinsically linked to the associated channel

Therefore, it is respectfully submitted that claim 13 is both novel and inventive over Roberts US 3,009,571.

**Response to Rejection of Claim 14**

Roberts discloses the operation of a single ejection device per associated channel, with the channels formed in an annular arrangement.

The present application discloses the operation of one or more annularly mounted ejectors with respect to the detection of a randomly distributed particulate in the annular inspection zone.

**Claim 14 is dependant on Claims 2 to 12 via Claim 13**

Due to the aforementioned differences and dependency, Claim 14 could not be considered obvious to one of average skill or taught under Roberts.

Therefore, it is respectfully submitted that claim 14 is both novel and inventive over Roberts US 3,009,571.

### **Response to Rejection of Claim 15**

Roberts discloses a singular ejection device per channel with a “plurality of paths” spaced annularly about the apparatus. Any increase in the diameter of the cone will result in lowering the ratio of number of channels to the effective sorting area. Thus, the number valves verses total available effective sorting area reduces.

Claim 15 has a singular row ejectors, such that the operation of a corresponding ejector or ejectors with respect to the detection of a randomly distributed particulate in the inspection zone. Preferably, the entire cone is used for the distribution of particulate. Any increase in diameter (d) results in a  $d^2$  ( $3.14 \times d$ ) increase in effective area. Thus, the number valves must also increase by  $d^2$  for a the increase in diameter. The wider the cone the more the ratio of effective sorting area and corresponding number of valves over total available area reduces.

Due to the aforementioned differences and dependency , the random bulk feed ejection of claim 15 could not be considered obvious to one of average skill or taught by Roberts singular ejection in a “plurality of paths”

Therefore, it is respectfully submitted that claim 15 is both novel and inventive over Roberts US 3,009,571.

### **Response to Rejection of Claim 16**

Roberts discloses the operation of a singular ejection device per channel (column 4 line 61 to 65 – Column 5 lines 6 to 13 and 19 to 26) in an annular arrangement forming a single row of ejection devices.

Claim 16 teaches the use of multiple rows of ejectors, that being of annular row of ejectors under annular row of ejectors vertically offset.

Ejectors in the vertical (from subsequent rows) are sequentially operated as the particulate under gravity passes each ejector in turn. Allowing addition rejection energy to be transferred to the particulate for each subsequent additional ejector sequentially activated.

The plurality of annular manifolds as per disputed Claim 20 are novel over Roberts.

Therefore, it is respectfully submitted that claim 16 is both novel and inventive over Roberts US 3,009,571

#### **Response to Rejection of Claims 17 and 20**

Examiners response “..The apparatus of claim 20 is inherently taught by the method set forth above because the elements are necessarily included for the method to function as claimed.”

Roberts discloses a method of sorting apparatus for an annular arrangement of channels or a “plurality of paths” (column 3, line 72 — column 4, line 18; column 4. line 66— column 5, line 35)

The method of sorting apparatus of claims 17 and 20 is for random bulk particulate. As discussed in prior claim responses, to a person with ordinary skill in the art, there are considerable differences in the Roberts “plurality of paths” channel sorting technique to the instant application’s annular random bulk sorting technique. Thus, the method could not be considered taught by Roberts.

Therefore, it is respectfully submitted that claims 17 and 20 are both novel and inventive over Roberts US 3,009,571.

#### **Response to Rejection of Claims 18 and 21**

Roberts teaches the formation of a series of singular particulate streams by the use of an annular channel arrangement. The channeled particulate enters the respective inspection zone for that channel and a detector for receiving light reflected from an article in each of the paths in succession.

Roberts also discloses that the detection and ejection devices are intrinsically linked to the channel and subsequently formed “plurality of paths” (Roberts column 5 lines 19 to 26) also see (fig 1).

The present application teaches a method of a formation of bulk feed of particulate from by means of the conical dispersion body member that randomly disperses the particles into an annular curtain of particles dispensed about a generally centered detector. The detector detects undesired particle(s) from random product curtain, tags and maps the particulate location. The Ejector or multiples thereof, associated to the particle location at point of ejection are operated to remove the particle from random bulk stream.

**Claim 18 is dependant on Claim 17, and Claim 21 is dependant on Claim 20**

Due to the aforementioned differences and dependency, the instant application’s annular random bulk sorting technique could not be considered as obvious to one of average skill or taught by Roberts “plurality of paths” channel sorting technique.

Therefore, it is respectfully submitted that claims 18 and 21 are both novel and inventive over Roberts US 3,009,571.

**Response to Rejection of Claims 19 and 22**

Roberts teaches a method in which a rotating mirror is used within the process to direct incandescent illumination from successive channeled particle streams to form part of the art of a channel sorting apparatus in an annular formation.

The present application teaches the method in which a rotating mirror constantly directs focused point source radiation to the randomly located particulate and also directs the resultant reflected focused point source radiation to the detector to form part of the art of annular random bulk annular sorting apparatus.

**Claim 19 is dependant on Claim 17, and Claim 22 is dependant on Claim 20**

Due to the aforementioned differences and dependency, the instant application's annular random bulk sorting technique could not be considered as obvious to one of average skill or taught by Roberts "plurality of paths" channel sorting technique.

Therefore, it is respectfully submitted that claims 19 and 22 are both novel and inventive over Roberts US 3,009,571.

**Response to Rejection of Claim 6 under 35 U.S.C. §103(a).**

Examiners response "It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a monochromatic light source in order to more accurately detect the light intensity by eliminating wavelengths outside the band of interest."

Roberts teaches a method in which a polychromatic "bank of incandescent lamps" (column 12 line 29) is used within the process to illuminate the desired target, and the resultant polychromatic reflected incandescent light (may be filtered to monochromatic) is detected to form part thereof of the art of a channel sorting apparatus in an annular formation.

The present application teaches a method in which a monochromatic point source is used within the process to project the monochromatic point source radiation onto the particulate and to detect of the resulting reflected monochromatic intensity and form part of the art of an annular random bulk sorting apparatus.

Due to dependency and hindsight aside, the present application's monochromatic point source approach could not be considered obvious under Roberts polychromatic incandescent light source filtered, by one of ordinary skill.

Claim 6 is dependant on Claim 2 via claim 5, and the use of "monochromatic point source" when used in combination with the novel bulk random particulate annular sorting apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that claim 6 is both novel and inventive over Roberts US 3,009,571.

**Response to Rejection of Claim 7 under 35 U.S.C. §103(a).**

Examiner comments, "Roberts fails to disclose removing all other wavelengths than the required wavelength to render the detected signal monochromatic, However, it is well known in the art to only allow a single wavelength of light to be detected by a detector. It would have been obvious to one of ordinary skill in the art at the time the invention was made to only allow a monochromatic band of light in order to more accurately detect the light intensity solely from the light source."

Roberts teaches a method in which a polychromatic "bank of incandescent lamps" are used to illuminate a particle in a known location (from channel in single file) to produce resultant reflected incandescent illumination for the particle to be detected to form part of the art of a channel sorting apparatus in an annular formation.

The current application teaches the a method in which filters are used within the process to remove any undesired wavelengths, including external light sources, and fluorescence (both important in a randomly located particle system) to maintain the monochromatic reflection of the monochromatic point source for detection to form part of the art of annular random bulk annular sorting apparatus.

Due to dependency and hindsight aside, the present application's random particle location monochromatic detection approach could not be considered obvious under Roberts known particle location polychromatic incandescent source filtered, by one of ordinary skill.

Claim 7 is dependant on Claim 2 via claims 6, and 5, and the use of "removing unwanted wavelengths" when used in combination with the novel bulk random particulate annular sorting apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that Claim 7 is both novel and inventive over Roberts US 3,009,571.

**Response to Rejection of Claim 8 under 35 U.S.C. §103(a).**

Roberts teaches a method in which a polychromatic "bank of incandescent lamps" are used to illuminate a particle in a know location (from channel in single file) to produce resultant reflected incandescent illumination and band pass filtered for the particle to be detected to form part of the art of a channel sorting apparatus in an annular formation. The present application teaches the method in which band pass filters are used within the process to filter the point source illumination to remove any undesired wavelengths, including external light sources, illumination and fluorescence (both important in a randomly located particle system) to produce a resultant monochromatic illumination for detection to form part of the art of annular random bulk annular sorting apparatus.

Due to dependency and hindsight aside, the present application's random particle location illumination approach could not be considered obvious under Roberts known particle location polychromatic incandescent source band pass filtered, by one of ordinary skill.

Claim 8 is dependant on Claim 2 via claims 7, 6, and 5, and the use of "band pass filters" when used in combination with the novel bulk random particulate annular sorting

apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that claim 8 is both novel and inventive over Roberts US 3,009,571.

**Response to Rejection of Claim 9 under 35 U.S.C. §103(a).**

Guenard 6855901 teaches a method in which filters are used within the process to discriminate the desired wavelengths and form part thereof of the art of “to identify recyclable materials containing barrier polymers from recyclable materials not containing barrier polymers”.

The instant application teaches the a method in which filters are used within the process to discriminate the desired wavelengths and form part thereof of the art of “annular random bulk annular sorting apparatus”

Due to dependency and hindsight aside, the present application’s annular random bulk sorting approach could not be considered obvious under Guenard by one of ordinary skill.

Claim 9 is dependant on Claim 2 via claims 7, 6, and 5, and the use of “band reject filters” when used in combination with the novel bulk random particulate annular sorting apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that Patent application 10/595.120 claim 9 is both novel and inventive over Roberts US 3,009,571

**Response to Rejection of Claim 9 under 35 U.S.C. §103(a).**

Guenard 6855901 teaches a method in which a optical grating may be used within the process to discriminate the desired wavelengths and form part thereof of the art of



“to identify recyclable materials containing barrier polymers from recyclable materials not containing barrier polymers”.

The present application teaches the a method in which a optical grating may be within the process to discriminate the desired wavelengths and form part thereof of the art of “annular random bulk annular sorting apparatus”

Hindsight aside, the annular random bulk sorting approach could not be considered obvious under Guenard by one of ordinary skill. Due to dependency and hindsight aside, the present application’s annular random bulk sorting approach could not be considered obvious under Guenard by one of ordinary skill.

Claim 11 is dependant on Claim 2 via claims 10 and 5, and the use of “diffraction gratings” when used in combination with the novel bulk random particulate annular sorting apparatus and method, is of a novel approach.

Therefore, it is respectfully submitted that claim 11 is both novel and inventive over Roberts US 3,009,571.

### **Drawings**

Attached to this amendment are new corrected drawings as requested by the Examiner because labels were handwritten.

### **Conclusion**

Reconsideration and reexamination of the application is respectfully requested. Applicant has made a genuine effort to respond to each of the Examiner’s objections and rejections in advancing the prosecution of this case. Applicant believes that all formal and substantive requirements for patentability have been met and that this case is in condition for

allowance, which action is respectfully requested. If any additional issues need to be resolved, the Examiner is requested to telephone the undersigned at his convenience.

Respectfully submitted,

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